MORELAND SCHOOL (PWS 6060048)
SOURCE WATER ASSESSMENT FINAL REPORT

December 6, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the well and aquifer characteristics.

This report, *Source Water Assessment for the Moreland School, Moreland, Idaho* describes the public water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Moreland School (PWS # 6060048) is a non-community, non-transient water system located in Bingham County. The drinking water system has one well source. The well serves approximately 245 persons and is located on the school's property.

The potential contaminant sources within the delineation capture zones include underground storage tank (UST) sites, leaking underground storage tank (LUST) sites, a landfill, sand and gravel pits, and dairies. Also found were sites regulated under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Superfund Amendments and Reauthorization Act (SARA), the Resource Conservation Recovery Act (RCRA), and the Toxic Release Inventory (TRI). Other sources identified that may contribute to the overall vulnerability of the water source were businesses within the delineated areas that may be considered potential contaminant sources and deep injection wells. Injection wells regulated under the Idaho Department of Water Resources generally are for the disposal of stormwater runoff or agricultural field drainage. There are also recharge points (active, proposed, and possible recharge sites on the Snake River Plain) located within the delineation. Additionally, Highway 20 and Highway 26 are transportation corridors that cross the delineation. If an accidental spill occurred from one of these corridors, inorganic chemical (IOC; i.e., nitrates) contaminants, volatile organic chemical (VOC; i.e., petroleum products) contaminants, synthetic organic chemical (SOC; i.e., pesticides) contaminants, or microbial (i.e. bacteria) contaminants could be added to the aquifer system. A complete list of potential contaminant sources is provided with this assessment.

For the assessment, a review of laboratory tests was conducted using the State Drinking Water Information System (SDWIS). Coliform bacteria were detected at various sample locations in the distribution system between May 1996 and December 1998. Coliform bacteria were detected at the wellhead on August 9, 1996, August 29, 1996, September 11, 1996, September 30, 1996, and October 23, 1996. The last detection of coliform bacteria in the distribution system was recorded in December 1998. The IOCs barium, fluoride, and nitrate have been detected in the drinking water, but at levels below the maximum contaminant level (MCL) for each chemical. No VOCs or SOCs have been detected in the drinking water.

Final susceptibility scores for the Moreland School drinking water system were derived from equally-weighted system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. A low rating in one or two categories coupled with a higher rating in another category results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories: IOCs (i.e. nitrates), VOCs (i.e. petroleum products), SOCs (i.e. pesticides), and microbial contaminants (i.e. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

In terms of final susceptibility, the well rated high for IOCs, VOCs, SOCs, and microbial contaminants. Hydrologic sensitivity and system construction scores rated high. Potential contaminant inventory and land uses scores rated high for IOCs, VOCs, and SOCs, and moderate for microbials.

The capture zones for the well intersects a priority area for the SOC atrazine. The organic priority area is where greater than 25% of the wells in the area show levels greater than 1% of the primary standard or other health standards (MCL for atrazine is 0.003 milligrams per liter). Atrazine is a widely used herbicide for control of broadleaf and grassy weeds.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the Moreland School, drinking water protection activities should continue efforts aimed at keeping the distribution system free of microbial contaminants that may affect the drinking water quality. The water system should continue using disinfection practices to treat the water source. In addition, drinking water protection activities should focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system’s components and its capacity). The well should maintain sanitary standards regarding wellhead protection. Also, any new sources that could be considered potential contaminant sources in the well’s zones of contribution should also be investigated and monitored to prevent future contamination. No potential contaminants (pesticides, paint, fuel, cleaning supplies, etc.) should be stored or applied within 50 feet of the well. Land uses within most of the source water assessment area are outside the property boundary for the Moreland School. Therefore, partnerships with state and local agencies, and industrial and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating employees and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods, proper lawn and garden care, and the importance of water conservation to name but a few. There are multiple resources available to help water systems implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Bingham County Soil and Water Conservation District. As major transportation corridors intersect the delineation (such as Highway 20 and Highway 26), the Idaho Department of Transportation should be involved in protection efforts.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR <u>MORELAND SCHOOL</u>, MORELAND, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are contained in this report. The list of significant potential contaminant source categories and their rankings used to develop this assessment is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the well, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water supply system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the public water system (PWS).**

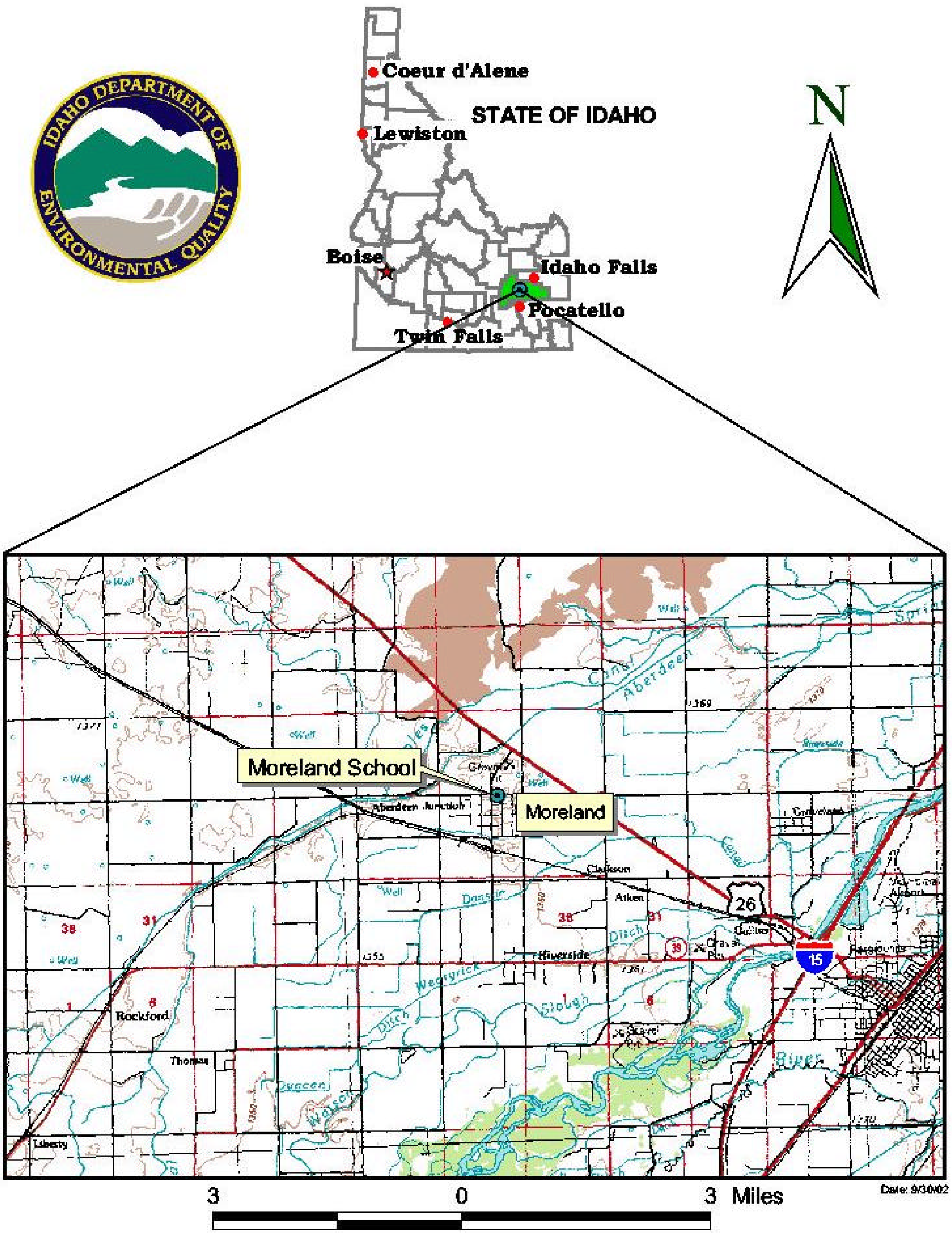
The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Moreland School (PWS # 6060048) is a non-community, non-transient water system located in Bingham County (Figure 1). The drinking water system has one well source. The well serves approximately 245 persons and is located on the school's property.

FIGURE 1 - Geographic Location of Moreland School PWS#: 6060048



Coliform bacteria were detected at various sample locations in the distribution system between May 1996 and December 1998. Coliform bacteria were detected in the wellhead sample on August 9, 1996, August 29, 1996, September 11, 1996, September 30, 1996, and October 23, 1996. The last detection of coliform bacteria in the distribution system was recorded in December 1998. The inorganic chemicals (IOCs) barium, fluoride, and nitrate have been detected in the drinking water, but at levels below the maximum contaminant level (MCL) for each chemical. No volatile organic chemicals (VOCs) or synthetic organic chemicals (SOCs) have been detected in the drinking water.

Defining the Zones of Contribution--Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zones of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. Washington Group International (WGI) was contracted by DEQ to define the public water system's zones of contribution. WGI used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the East Margin Area of the Eastern Snake River Plain (ESRP) hydrologic province in the vicinity of the Moreland School. The computer model used site specific data assimilated by WGI from a variety of sources including well logs (when available), operator records and hydrogeologic reports. A summary of the hydrogeologic information from the WGI report is provided below.

Hydrogeologic Conceptual Model

The East Margin Area encompasses 821 square miles, representing approximately 8 percent of the total area of the ESRP hydrologic province. The majority of the East Margin Area is within Bingham County, with small areas occurring in Bannock, Bonneville, and Power counties.

The regional ESRP aquifer is the most significant aquifer in the East Margin Area and consists primarily of basalt of the Quaternary-aged Snake River Group. However, additional water-bearing units are used for water supply along the margin of the ESRP. In order of decreasing age, the most significant aquifers in the Michaud Flats area are bedded rhyolite (volcanic rock) of the Tertiary-aged Starlight Formation and Quaternary-aged gravels of a low relief plain formed by running water (pediment), basalt of the Big Hole Formation, and stream deposits of the Sunbeam Formation (see Jacobson, 1982, p. 7, and Corbett, et al., 1980, pp. 6-10). A few shallow domestic wells in the central Michaud Flats area also are completed in Michaud Gravel, which is the shallow water-table aquifer. The American Falls Lake Beds Formation (AFLB) confines the deeper aquifers and averages 80 feet in thickness in the central Michaud Flats area (Jacobson, 1984, p. 6). The AFLB pinches out in the eastern Michaud Flats area near the Portneuf River, effectively combining the shallow and deep stream deposits into a single water table aquifer (Bechtel, 1994, p. 2-2). Other aquifers in the East Margin Area include fractured quartzite that has been developed near Blackfoot, stream deposits near the cities of Firth and Basalt.

PWS wells in the East Margin Area of the ESRP province produce water from five different aquifers: the Regional Eastern Snake River Plain aquifer, three alluvial (or stream deposited) aquifers (Eastern Michaud Flats, Firth/Basalt, and Gibson Terrace/Pocatello Bench) and a quartzite aquifer (Blackfoot).

Regional Eastern Snake River Plain Aquifer

The ESRP is a northeast trending basin located in southeastern Idaho. The 10,000 square miles of the plain are primarily filled with highly fractured layered Quaternary-aged basalt flows of the Snake River Group, which are between (intercalated) layers of rocks formed by sediment deposition (sedimentary) along the margins (Garabedian, 1992, p. 5). Quaternary-aged basalts are estimated to be 100 to 1,500 feet thick, with the majority of the area in the range of 100 to 500 feet thick (Whitehead, 1992, Plate 3). Individual basalt flows range from 10 to 50 feet thick, averaging 20 to 25 feet thick (Lindholm, 1996, p. 14). Basalt is thickest in the central part of the eastern plain and thins toward the margins. Whitehead (1992, p. 9) estimates the total thickness of the flows to be as great as 5,000 feet. A thin layer (0 to 100 feet) of windblown and stream-produced sediments overlies the basalt. The plain is bounded on the northeast by rocks of the Yellowstone Group (mainly rhyolite) and Idavada Volcanics to the southwest. These rocks may also underlie the plain (Garabedian, 1992, p. 5). Granite of the Idaho batholith borders the plain to the northwest, along with sedimentary rocks and rocks changed by heat and/or pressure (metamorphic) (Cosgrove et al., 1999, p. 10). The Snake River flows along part of the southern boundary and is the only drainage that leaves the plain. A high degree of connectivity with the regional aquifer system is displayed over much of the river as it passes through the plain. However, some reaches are believed to be perched or separated from the main ground water by unsaturated rock, such as the Lewisville-to-Shelly reach. Rivers and streams entering the plain from the south are tributary to the Snake River. With the exception of the Big and Little Wood rivers, rivers entering from the north vanish into the basalts of the Snake River Plain aquifer that have a higher ability to transmit water.

The layered basalts of the Snake River Group host one of the most productive aquifers in the United States. The aquifer is generally considered unconfined, yet may be confined locally because of interbedded clay and dense unfractured basalt (Whitehead, 1992, p. 26). Whitehead (1992, p. 22) and Lindholm (1996, p.1) report that well yields of 2,000 to 3,000 gallons per minute (gpm) are common for wells open to less than 100 feet of the aquifer. Transmissivities obtained from test data in the upper 100 to 200 feet of the aquifer range from less than 0.1 square feet per second (ft^2/sec) to 56 ft^2/sec ($1.0x10^4$ to $4.8x10^6$ ft^2/day; Garabedian, 1992, p. 11, and Lindholm, 1996, p. 18). Lindholm (1996, p. 18) estimates aquifer thickness to range from 100 feet near the plain's margin to thousands of feet near the center. Models of the regional aquifer have used values ranging from 200 to 3,000 feet to represent aquifer thickness (Cosgrove et al., 1999, p.15).

Regional ground water flow is to the southwest paralleling the basin (Cosgrove et al., 1999; deSonneville, 1972, p. 78; Garabedian, 1992, p. 48; and Lindholm, 1996, p. 23). Reported water table gradients range from 3 to 100 feet/mile and average 12 feet/mile (Lindholm, 1996, p. 22). Gradients steepen at the plain's margin and at discharge locations. The estimated effective ratio of the rock's open space volume to its total volume range from 0.04 to more than 0.25 (Ackerman, 1995, p.1, and Lindholm, 1996, p.16).

The majority of aquifer recharge results from surface water irrigation activities (incidental recharge), which divert water from the Snake River and its tributaries (Ackerman, 1995, p. 4, and Garabedian, 1992, p. 11) and locally from canal leakage. Natural recharge occurs through stream losses, direct precipitation, and tributary basin underflow.

Aquifer discharge occurs primarily as seeps and springs on the northern wall of the Snake River canyon near Thousand Springs and near American Falls and Blackfoot (Garabedian, 1992, p.17). To a lesser degree, discharge also occurs through pumping and underflow.

The East Margin Area is among the most transmissive regions of the regional aquifer, therefore it has a higher ability to transmit water. A transmissivity of 21 ft^2/sec was used to represent the upper 200 feet of the regional aquifer in the East Margin Area in the three-dimensional USGS ground water flow model (Garabedian, 1992, Plate 6). The equivalent hydraulic conductivity or the rate at which water can move through permeable material is 9,072 feet per day (ft/day). This value is consistent with the range of hydraulic conductivity (9,500 to 11,708 ft/day) calculated using data from a constant-rate aquifer test conducted in 1981 (Jacobson, 1982, p. 23). This range was calculated by dividing the estimated transmissivity (228,000 to 281,000 ft^2/day) by the perforated interval of the observation well (24 feet). The geometric mean hydraulic conductivity based on analysis of specific capacity data from PWS wells (135 ft/day) is significantly lower.

A published water table map of the Upper Snake River Basin (IDWR, 1997, p. 9) indicates that the ground water flow direction in the ESRP aquifer in the East Margin Area is similar to that depicted at the regional scale (e.g., Garabedian, 1992, Plate 4).

Recharge from precipitation and surface water irrigation in the East Margin Area ranges from less than 10 to more than 20 inches per year (Garabedian, 1992, Plate 8). The low end of the range applies to the area near Blackfoot, while the high end applies to the area on the west side of American Falls Reservoir near Aberdeen.

Kjelstrom (1995, p. 13) reports an annual river loss of 280,000 acre-feet to the regional basalt aquifer for the 27.5-mile Lewisville-to-Shelley reach of the Snake River and 110,000 acre-feet for the 23.5-mile Shelley-to-Blackfoot reach. Annual river gains of 1,900,000 acre-feet for the 36.6-mile Blackfoot-to-Neeley reach are also estimated (Kjelstrom, 1995, p. 13). A seepage study conducted in the fall of 1980 on the Portneuf River showed a gain of about 560 cubic feet per second (ft^3/sec) (405,691 acre-feet) for the 13-mile Pocatello-to-American Falls Reservoir reach (Jacobson, 1982, p. 16). The average flow in the Blackfoot River near the city of Blackfoot is low at Station #13068500 (5.2 ft^3/sec; USGS, 2001) compared to the flow in the Snake River near the city of Blackfoot at Station #13069500 (2,900 ft^3/sec; USGS, 2001).

The Moreland School well is completed or assumed to be completed in the regional basalt aquifer. The delineated source water assessment area for the Moreland School well trends in a northeast direction and is elongated and conical in shape. The length of the delineation extends approximately 22 miles into the City of Idaho Falls (Appendix B). The actual data used by WGI in determining the source water assessment delineation areas are available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases identified potential contaminant sources within the delineation areas. Some of these sources include dairies, underground storage tanks (USTs), leaking underground storage tanks (LUSTs), a landfill, and sand and gravel pits.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply source.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted during September of 2002. The first phase involved identifying and documenting potential contaminant sources within the Moreland School source water assessment area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. This task was undertaken with the assistance of Mr. Alden Hale. At the time of the enhanced inventory, no additional potential contaminant sources were found within the delineated source water area. A map with the well location, delineated areas and potential contaminant sources are provided with this report (Appendix B). Each potential contaminant source has been given a unique site number that references tabular information associated with the public water well (Appendix A).

Section 3. Susceptibility Analyses

The susceptibility of the well to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for the well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix C contains the susceptibility analysis worksheet. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors. These factors are surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the water producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet from the surface protect the ground water from contamination.

Hydrologic sensitivity was rated high for the well (Table 1). This is based upon moderate to well drained regional soil classes, as defined by the National Resource Conservation Service (NRCS), being located within the delineated area. There was insufficient well log information to evaluate the vadose zone composition, the first depth to ground water, and whether there is at least 50 feet of cumulative thickness of low permeability material that could reduce the downward movement of contaminants. If a well log had been available the hydrologic sensitivity scores may have been lower.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system that can better protect the water. If the casing and annular seal both extend into a low permeability unit then the possibility of cross contamination from other aquifer layers is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capabilities. When information was adequate, a determination was made as to whether the casing and annular seals extend into low permeability units and whether current PWS construction standards are met.

The system construction score rated high for the well. The 2001 sanitary survey (conducted by the Southeastern District Health Department) states the wellhead has a well vent but is not screened or downturned. The sanitary survey also states the conduit connection at the well cap must be water tight to help prevent contamination from entering the well.

It is unknown whether the casing and annular seal extend into a low permeable unit, such as clay, or whether the highest water production for the well is 100 feet below the static water level. If the casing and annular seal extend into a fine-grained medium, this may reduce the chances of laterally migrating contamination into the well. The well casing height is adequate. The well is located inside a 100-year floodplain, which may increase the chance of contaminants being drawn into the drinking water source by surface water flooding.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all public water systems to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead and if the well is designed to yield greater than 50 gpm a minimum of a 6-hour pump test is required. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. In our search for well construction information, we were unable to locate a well log for the well. Because the well's construction could not be accurately assessed without a well log and not knowing the approximate age of the well, it is considered that the well does not meet the current IDWR Well Construction Standards for a PWS. Therefore, the well received a conservatively high rating in terms of system construction susceptibility to contamination.

Potential Contaminant Source and Land Use

The potential contaminant sources and land use within the delineated zones of water contribution are assessed to determine the well's susceptibility. When agriculture is the predominant land use in the area, this may increase the likelihood of agricultural wastewater infiltrating the ground water system. Agricultural land is counted as a source of leachable contaminants and points are assigned to this rating based on the percentage of agricultural land. The predominant land use within the delineated capture zones of the Moreland School is irrigated agricultural land.

In terms of potential contaminant sources and land use susceptibility the ratings are as follows. The well rated high for IOCs (i.e., nitrates), VOCs (i.e., petroleum related products), and SOCs (i.e., pesticides), and moderate for microbial contaminants (i.e., bacteria).

Potential contaminant sources found within the delineated areas include dairies, USTs, a landfill, LUSTs, and sand and gravel pits. Also found were sites regulated under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Superfund Amendments and Reauthorization Act (SARA), the Resource Conservation Recovery Act (RCRA), and the Toxic Release Inventory (TRI). Most of the potential contaminant sources fall within the 6-10 year TOT zone. The locations of potential contaminant sources and delineated TOT zones for the well is listed in Appendix A.

Final Susceptibility Rating

A detection above a drinking water standard MCL or any detection of a VOC or SOC at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. In this case, the well automatically rated high for microbial contamination due to the numerous detections at the well. Additionally, potential contaminant sources within 50 feet of a wellhead will automatically lead to a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and a large percentage of agricultural land contribute greatly to the overall ranking.

Table 1. Summary of Moreland School Susceptibility Evaluation

Drinking Water Source	Susceptibility Scores									
	Hydrologic Sensitivity	Potential Contaminant Inventory and Land Use				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well	H	H	H	H	M	H	H	H	H	H*

H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

H* = Indicates source automatically scored high susceptibility due to the detections of coliform bacteria at the wellhead.

Susceptibility Summary

In terms of final susceptibility, the well rated high for IOCs, VOCs, SOCs, and microbial contaminants. Hydrologic sensitivity and system construction scores rated high. Potential contaminant inventory and land uses scores rated high for IOCs, VOCs, and SOCs, and moderate for microbials.

The IOCs barium, fluoride, and nitrate represent the main water chemistry recorded in the PWS, although the reported concentrations of these chemicals were below the MCL for each chemical. Water chemistry tests have not detected VOCs or SOCs in the drinking water.

The county level agriculture-chemical use is considered high in this area due to a significant amount of agricultural land. Although there may only be a small portion of agriculture land in the direct vicinity of the well, it is useful as a tool in determining the overall usage of chemicals such as pesticides and how that may impact ground water through infiltration and surface water runoff.

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the Moreland School, drinking water protection activities should continue efforts aimed at keeping the distribution system free of microbial contaminants that may affect the drinking water quality. The water system should continue using disinfection practices to treat the water source. In addition, drinking water protection activities should focus on correcting any deficiencies outlined in the sanitary survey. The well should maintain sanitary standards regarding wellhead protection. Also, any new sources that could be considered potential contaminant sources in the well’s zones of contribution should also be investigated and monitored to prevent future contamination. No potential contaminants (pesticides, paint, fuel, cleaning supplies, etc.) should be stored or applied within 50 feet of the well. Land uses within most of the source water assessment area are outside the property boundary for the Moreland School. Therefore, partnerships with state and local agencies, and industrial and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating employees and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods, proper lawn and garden care, and the importance of water conservation to name but a few. There are multiple resources available to help water systems implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Bingham County Soil and Water Conservation District. As major transportation corridors intersect the delineation (such as Highway 20 and Highway 26), the Idaho Department of Transportation should be involved in protection efforts.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

DEQ Pocatello Regional Office	(208) 236-6160
DEQ State Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper, Idaho Rural Water Association, at 208-343-7001 (mlharper@idahoruralwater.com) for assistance with drinking water protection (formerly wellhead protection) strategies.

References Cited

Ackerman, D.J., 1995, Analysis of Steady-State Flow and Advective Transport in the Eastern Snake River Plain Aquifer System, Idaho, U.S. Geological Survey Water-Resources Investigations Report 94-4257, 25 p. I-FY95.

Bechtel Environmental, Inc., 1994, Remedial Investigation/Feasibility Study, Ground water Flow Monitoring Report, 95 p.

Corbett, M.K., J.E. Anderson, and J.C. Mitchell, 1980, An Evaluation of Thermal Water Occurrences in the Tyhee Area, Bannock County, Idaho, Idaho Department of Water Resources, Water Information Bulletin, No. 30, 67 p.

Cosgrove, D.M., G.S. Johnson, S. Laney, and J. Lindgren, 1999, Description of the IDWR/UI Snake River Plain Aquifer Model (SRPAM), Idaho Water Resources Research Institute, University of Idaho, 95 p.

deSonneville, J.L.J, 1972, Development of a Mathematical Ground water Model: Idaho Water Resources Research Institute, University of Idaho, Moscow, Idaho, 227 p.

Garabedian, S.P., 1992, Hydrology and Digital Simulation of the Regional Aquifer System, Eastern Snake River Plain, Idaho, U.S. Geological Survey Professional Paper 1408-F, 102 p., 10 pl. I--FY92.

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environment Managers, 1997. “Recommended Standards for Water Works.”

Idaho Division of Environmental Quality Ground Water Program, October 1999. Idaho Source Water Assessment Plan.

Idaho Department of Environmental Quality. 2000. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Idaho Department of Water Resources, 1997, Upper Snake River Basin Study, 85 p.

Jacobson, N.D., 1982, Ground Water Conditions in the Eastern Part of Michaud Flats, Fort Hall Indian Reservation, Idaho, U.S. Geological Survey Open-File Report 82-570, 35 p.

Jacobson, N.D., 1984, Hydrogeology of Eastern Michaud Flats, Fort Hall Indian Reservation, Idaho, U.S. Geological Survey Water-Resources Investigations Report 84-4201, 42 p.

Kjelstrom, L.C., 1995, Streamflow Gains and Losses in the Snake River and Ground water Budgets for the Snake River Plain, Idaho and Eastern Oregon, U.S. Geological Survey Professional Paper 1408-C, 47 p. I-FY95.

Lindholm, G.F., 1996, Summary of the Snake River Plain Regional Aquifer-System analysis in Idaho and Eastern Oregon, U.S. Geological Survey Professional Paper 1408-A, 59 p.

Safe Drinking Water Information System (SDWIS). Idaho Department of Environmental Quality.

Southeastern District Health Department. 2001. Sanitary Survey of Moreland School:PWS #6060048, Bingham County.

United States Geological Survey, 2001, Current Streamflow Conditions, http://idaho.usgs.gov/rt-cgi/gen_tbl_pg.

USGS - see United States Geological Survey.

Washington Group International, Inc, October 2001. Source Area Delineation Report for the East Margin Area of the Eastern Snake River Plain Hydrologic Province.

Whitehead, R.L., 1992, Geohydrologic Framework of the Snake River Plain Regional Aquifer System, Idaho and Eastern Oregon, U.S. Geological Survey Professional Paper 1408-B, 32p. I-FY92.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLA – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Appendix A

Moreland School
Potential Contaminant Source Inventory

Table 2. Potential Contaminants

Site	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
	Highway 26	0-3	GIS MAP	IOC, VOC, SOC, Microbials
1	UST Site-Gas Station; Open	0-3	Database Search	VOC, SOC
2	Automobile Repairing & Service	0-3	Database Search	IOC, VOC, SOC
3	Trucking-Heavy Hauling	0-3	Database Search	VOC, SOC
4	Automobile Repairing & Service	0-3	Database Search	IOC, VOC, SOC
5	CERCLA Site	0-3	Database Search	IOC, VOC, SOC
6	Mine/Quarry	0-3	Database Search	IOC, VOC, SOC
7	Recharge Point	0-3	Database Search	IOC, VOC, SOC, Microbials
8	Landfill	0-3	Database Search	IOC, VOC, SOC, Microbials
9	CERCLA Site	3-6	Database Search	IOC, VOC, SOC
10	Recharge Point	3-6	Database Search	IOC, VOC, SOC
11	Recharge Point	3-6	Database Search	IOC, VOC, SOC
12	Recharge Point	3-6	Database Search	IOC, VOC, SOC
13	UST Site-Commercial; Closed	6-10	Database Search	VOC, SOC
14	UST Site-Other; Closed	6-10	Database Search	VOC, SOC
15	UST Site-Not Listed; Closed	6-10	Database Search	VOC, SOC
16	UST Site-Gas Station; Open	6-10	Database Search	VOC, SOC
17	UST Site-Gas Station; Closed	6-10	Database Search	VOC, SOC
18	UST Site-Commercial; Closed	6-10	Database Search	VOC, SOC
19	UST Site-Gas Station; Open	6-10	Database Search	VOC, SOC
20	UST Site-Utilities; Closed	6-10	Database Search	VOC, SOC
21	UST Site-Not Listed; Closed	6-10	Database Search	VOC, SOC
22	UST Site-Not Listed; Closed	6-10	Database Search	VOC, SOC
23	UST Site-Contractor; Open	6-10	Database Search	VOC, SOC
24	UST Site-Local Government; Closed	6-10	Database Search	VOC, SOC
25	UST Site-Gas Station; Open	6-10	Database Search	VOC, SOC
26	UST Site-Local Government; Open	6-10	Database Search	VOC, SOC
27	UST Site-Utilities; Closed	6-10	Database Search	VOC, SOC
28	UST Site-Gas Station; Open	6-10	Database Search	VOC, SOC
29	UST Site-Gas Station; Open	6-10	Database Search	VOC, SOC
30	UST Site-Commercial; Closed	6-10	Database Search	VOC, SOC
31	UST Site-Gas Station; Open	6-10	Database Search	VOC, SOC
32	UST Site-Truck/Transporter; Open	6-10	Database Search	VOC, SOC
33	Dairy	6-10	Database Search	IOC
34	Dairy	6-10	Database Search	IOC
35	Automobile Dealers-Used Cars	6-10	Database Search	VOC, SOC
36	Hydraulic Equipment-Repairing	6-10	Database Search	VOC, SOC
37	Trucking	6-10	Database Search	VOC, SOC
38	Veterinarians	6-10	Database Search	IOC, VOC
39	Concrete Contractors	6-10	Database Search	IOC, VOC, SOC
40	Boat Dealers	6-10	Database Search	VOC, SOC
41	Steel Fabricators	6-10	Database Search	IOC, VOC
42	Oils-Fuel (Wholesale)	6-10	Database Search	VOC, SOC
43	Tree Service	6-10	Database Search	VOC, SOC
44	Automobile Lubrication Service	6-10	Database Search	IOC, VOC, SOC
45	Automobile Renting & Leasing	6-10	Database Search	VOC, SOC
46	Landscape Contractors	6-10	Database Search	IOC, VOC, SOC
47	Concrete Contractors	6-10	Database Search	IOC, VOC, SOC
48	Trucking-Heavy Hauling	6-10	Database Search	VOC, SOC

Site	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
49	General Contractors	6-10	Database Search	IOC, VOC, SOC
50	Controls Systems/Regulators	6-10	Database Search	IOC, VOC, SOC
51	Landscape Contractors	6-10	Database Search	IOC, VOC, SOC
52	Cleaners	6-10	Database Search	VOC
53	Gazebos	6-10	Database Search	IOC, VOC
54	Trucking-Heavy Hauling	6-10	Database Search	VOC, SOC
55	Painters	6-10	Database Search	VOC
56	Hardware-Retail	6-10	Database Search	IOC, VOC, SOC
57	Paving Contractors	6-10	Database Search	VOC, SOC
58	Oils-Fuel (Wholesale)	6-10	Database Search	VOC, SOC
59	Service Industry Machinery (Manufacturers)	6-10	Database Search	VOC, SOC
60	Painters	6-10	Database Search	VOC
61	Trucking-Motor Freight	6-10	Database Search	VOC, SOC
62	Boat Dealers	6-10	Database Search	VOC, SOC
63	Automobile Customizing	6-10	Database Search	IOC, VOC, SOC
64	Snowmobiles	6-10	Database Search	VOC, SOC
65	General Contractors	6-10	Database Search	IOC, VOC, SOC
66	Gas Companies	6-10	Database Search	VOC, SOC
67	Demolition Contractors	6-10	Database Search	IOC, VOC, SOC
68	Storage-Household & Commercial	6-10	Database Search	IOC, VOC, SOC
69	Home Builders	6-10	Database Search	IOC, VOC, SOC
70	Trucking-Heavy Hauling	6-10	Database Search	VOC, SOC
71	Automobile Parts & Supplies-Retail	6-10	Database Search	VOC, SOC
72	Truck-Repairing & Service	6-10	Database Search	IOC, VOC, SOC
73	Movers	6-10	Database Search	VOC, SOC
74	House & Building Movers	6-10	Database Search	VOC, SOC
75	Wrecker Service	6-10	Database Search	IOC, VOC, SOC
76	Veterinarians	6-10	Database Search	IOC, VOC
77	Painters	6-10	Database Search	VOC
78	Trailers-Horse (Wholesale)	6-10	Database Search	VOC, SOC
79	Landscape Contractors	6-10	Database Search	IOC, VOC, SOC
80	X-Ray Laboratories-Industrial	6-10	Database Search	IOC, VOC, SOC
81	Photographers-Portrait	6-10	Database Search	VOC
82	Carpet & Rug Cleaners	6-10	Database Search	VOC
83	Electric Equipment & Supplies-Wholesale	6-10	Database Search	IOC, VOC
84	Automobile Renting & Leasing	6-10	Database Search	VOC, SOC
85	Laboratories-Testing	6-10	Database Search	IOC, VOC, SOC
86	Dairies	6-10	Database Search	IOC
87	Hardware-Retail	6-10	Database Search	IOC, VOC, SOC
88	Plumbing Drain & Sewer Cleaning	6-10	Database Search	IOC, VOC
89	Truck Renting & Leasing	6-10	Database Search	VOC, SOC
90	Excavating Contractors	6-10	Database Search	IOC, VOC, SOC
91	Veterinarians	6-10	Database Search	IOC, VOC
92	Car Washing & Polishing	6-10	Database Search	IOC, VOC, SOC
93	Automobile-Antique & Classic	6-10	Database Search	VOC, SOC
94	Automobile Dealers-Used Cars	6-10	Database Search	VOC, SOC
95	Cleaners	6-10	Database Search	VOC
96	Landscape Contractors	6-10	Database Search	IOC, VOC, SOC

Site	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
97	Tree Service	6-10	Database Search	VOC, SOC
98	Recycling Centers (Wholesale)	6-10	Database Search	IOC, VOC, SOC
99	Pile Driving Equipment	6-10	Database Search	VOC, SOC
100	Excavating Contractors	6-10	Database Search	IOC, VOC, SOC
101	Well Drilling	6-10	Database Search	IOC, VOC, SOC
102	Machine Shops	6-10	Database Search	IOC, VOC, SOC
103	Recycling Centers (Wholesale)	6-10	Database Search	IOC, VOC, SOC
104	Trucking-Heavy Hauling	6-10	Database Search	VOC, SOC
105	Service Stations-Gasoline & Oil	6-10	Database Search	VOC, SOC
106	Tree Service	6-10	Database Search	VOC, SOC
107	Leather Gloves & Mittens (Manufacturers)	6-10	Database Search	VOC
108	Truck Stops	6-10	Database Search	VOC, SOC
109	Limousine Service	6-10	Database Search	VOC, SOC
110	TRI	6-10	Database Search	VOC, SOC
111	RCRA Site	6-10	Database Search	SOC
112	RCRA Site	6-10	Database Search	IOC, VOC, SOC
113	RCRA Site	6-10	Database Search	IOC, VOC, SOC
114	RCRA Site	6-10	Database Search	VOC, SOC
115	RCRA Site	6-10	Database Search	IOC, VOC, SOC
116	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
117	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
118	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
119	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
120	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
121	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
122	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
123	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
124	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
125	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
126	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
127	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
128	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
129	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
130	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
131	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
132	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
133	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
134	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
135	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
136	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
137	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
138	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
139	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
140	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
141	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
142	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
143	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
144	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
145	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC

Site	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
146	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
147	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
148	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
149	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
150	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
151	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
152	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
153	SARA Site	6-10	Database Search	IOC, VOC, SOC
154	SARA Site	6-10	Database Search	VOC, SOC
155	SARA Site	6-10	Database Search	VOC, SOC
156	SARA Site	6-10	Database Search	IOC, VOC, SOC
157	SARA Site	6-10	Database Search	VOC, SOC
158	SARA Site	6-10	Database Search	IOC, VOC, SOC
159	SARA Site	6-10	Database Search	IOC, VOC, SOC
160	SARA Site	6-10	Database Search	IOC, VOC, SOC
161	Recharge Point	6-10	Database Search	IOC, VOC, SOC
162	Recharge Point	6-10	Database Search	IOC, VOC, SOC
163	Recharge Point	6-10	Database Search	IOC, VOC, SOC
164	Recharge Point	6-10	Database Search	IOC, VOC, SOC
165	Recharge Point	6-10	Database Search	IOC, VOC, SOC
166	Recharge Point	6-10	Database Search	IOC, VOC, SOC
167	Recharge Point	6-10	Database Search	IOC, VOC, SOC
168	Recharge Point	6-10	Database Search	IOC, VOC, SOC
169	Recharge Point	6-10	Database Search	IOC, VOC, SOC
170	Recharge Point	6-10	Database Search	IOC, VOC, SOC
171	Recharge Point	6-10	Database Search	IOC, VOC, SOC
172	Recharge Point	6-10	Database Search	IOC, VOC, SOC
173	Recharge Point	6-10	Database Search	IOC, VOC, SOC
174	Recharge Point	6-10	Database Search	IOC, VOC, SOC
175	Recharge Point	6-10	Database Search	IOC, VOC, SOC
176	Recharge Point	6-10	Database Search	IOC, VOC, SOC
177	Recharge Point	6-10	Database Search	IOC, VOC, SOC
178	Recharge Point	6-10	Database Search	IOC, VOC, SOC
179	Recharge Point	6-10	Database Search	IOC, VOC, SOC
180	Recharge Point	6-10	Database Search	IOC, VOC, SOC

[1] SARA = Superfund Amendments and Reauthorization Act, RCRA = Resource Conservation Recovery Act, CERCLA = Comprehensive Environmental Response Compensation and Liability Act, TRI = Toxic Release Inventory UST = underground storage tank, LUST = leaking underground storage tank, TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead, IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Appendix B

Delineation and Potential Contaminant Inventory Location Map

Appendix C

Moreland School
Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report	Public Water System Name: MORELAND SCHOOL	WELL
	Public Water System Number 6060048	10/21/02 1:54:22 PM

1. System Construction		SCORE
Drill Date	unknown	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	2001
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	NO	1
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	NO	1
	Total System Construction Score	6

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
	Total Hydrologic Score	6

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	NO	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	7	9	9	3
(Score = # Sources X 2) 8 Points Maximum		8	8	8	6
Sources of Class II or III leacheable contaminants or	YES	9	9	5	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	2	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		16	16	18	10
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	25 to 50% Irrigated Agricultural Land	1	1	1	
Potential Contaminant Source / Land Use Score - Zone II		4	4	4	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0
Cumulative Potential Contaminant / Land Use Score		27	25	29	12

4. Final Susceptibility Source Score	17	17	18	16
5. Final Well Ranking	High	High	High	High